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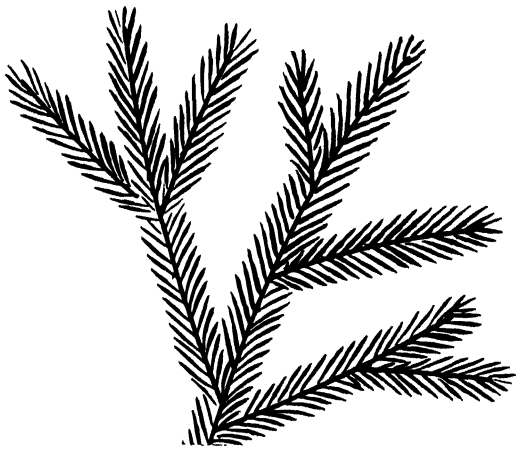
INSECT PESTS *of*

CHRISTMAS TREES IN OHIO

R. B. NEISWANDER



OHIO AGRICULTURAL EXPERIMENT STATION
Wooster, Ohio

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INSECT PESTS OF CHRISTMAS TREES IN OHIO

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The conifers that are grown for Christmas trees in Ohio are primarily Scotch, red and white pine, and white and Norway spruce. The insects included in this discussion are limited to those that sometimes attack one or more species in this Christmas tree group.

Relatively few insects cause severe damage to Christmas trees and it is seldom that all of these appear in a planting. For that reason an annual spraying schedule is not necessary. However, insects such as the European pine shoot moth and the European pine sawfly may destroy the ornamental value of a planting if they are not controlled. It is essential, therefore, that Christmas tree growers learn to recognize the pests that are potentially destructive and be prepared to combat them if necessary. If an infestation is recognized when it appears on a relatively small group of trees, it can often be controlled before it involves the entire planting.

EUROPEAN PINE SHOOT MOTH

Rhyacionia bouliana (Schiff.)

The European pine shoot moth is perhaps the most destructive insect pest of Christmas trees in Ohio. However, it is known to occur only in the northern half of the State. It is primarily a pest of red and Austrian pine, but sometimes causes damage to Scotch and mugo pine as well.

The larvae which are brown in color and are approximately a half inch long when full grown, burrow into the new shoots in April and May and either kill or distort them (Figure 1). Severe infestations not only destroy the ornamental value of the trees, but may render them worthless for the production of lumber.

The insect lives over winter as a small larva inside an injured bud. It resumes feeding when growth starts in the spring and becomes full grown in late May or early June. It then changes to a pupa and finally to a moth inside its burrow. The moths emerge primarily during June and deposit eggs on the needles. The eggs begin hatching during the last few days of June and continue to hatch over a period of approximately three weeks. The newly hatched larvae feed at the base of the needles for a short time and as a result many needles are killed. The larvae then enter hiberation in buds located at or near the tips of twigs.

CONTROL

If an infestation of European pine shoot moth larvae is recognized when it first appears, it often can be held in check by cutting out and destroying the injured shoots before they become abundant. This should be done in May when the injury shows up prominently.

Fig. 1.—Red pine shoots distorted by the European pine shoot moth, with one cut open (insert) to show a larva and pupa within.

DDT has proven effective in control of the European pine shoot moth and one application is usually adequate. However, it must be applied liberally in order to cover all needles and buds. One gallon of 25% emulsifiable concentrate or 4 pounds of 50% powder should be used per 100 gallons of water. DDT may be applied in mid-April when the buds are swelling and the larvae are leaving their hibernating quarters to enter growing shoots; or between June 25 and July 5 when the eggs are hatching. The April application will usually leave a deposit of DDT on the needles sufficient to kill any European pine sawfly larvae that may appear during the latter part of April.

Dusts have proven less effective than sprays in experimental tests and airplane applications have not yielded adequate control. It is essential that a deposit of DDT be placed at the base of the needles and this is difficult to accomplish by airplane.

SAWFLIES

In recent years the European pine sawfly *Neodiprion sertifer* (Geoff.), has been causing damage to many Scotch and red pine plantings in the northern half of the State. The larvae are greenish-brown in color and become about one inch long when full grown. They appear in large colonies on the tips of branches during the latter part of April or early in May (Figure 2). The larvae feed only on the old needles, but may defoliate trees by the first of June. Injured trees are seldom killed during the first year they are attacked because the new needles that develop during May and June are not injured. However, heavily infested trees are weakened, and complete destruction of the old needles during 2 or 3 consecutive seasons may result in the death of the trees.

European pine sawfly larvae become full grown during the first half of June. They then drop to the ground where they change to pupae. During September and October the small bee-like adults emerge and deposit eggs in the needles on the tips of branches. The insect lives over winter in the egg stage.

Other species of sawflies sometimes occur in smaller numbers and at different times of the year, particularly in southern Ohio. All species of pine are subject to attack. The control measures described below were developed primarily for the European pine sawfly, but are effective in killing other species also if applied when the larvae are small.

CONTROL

Sawflies can be controlled by spraying infested trees with DDT at the rate of 2 quarts of 25% emulsifiable concentrate or 2 pounds of 50%

wettable powder in 100 gallons of water. A 5% DDT dust is also effective. Airplane applications at the rate of 1½ pounds of actual DDT per acre have proven effective both as dusts and as sprays.

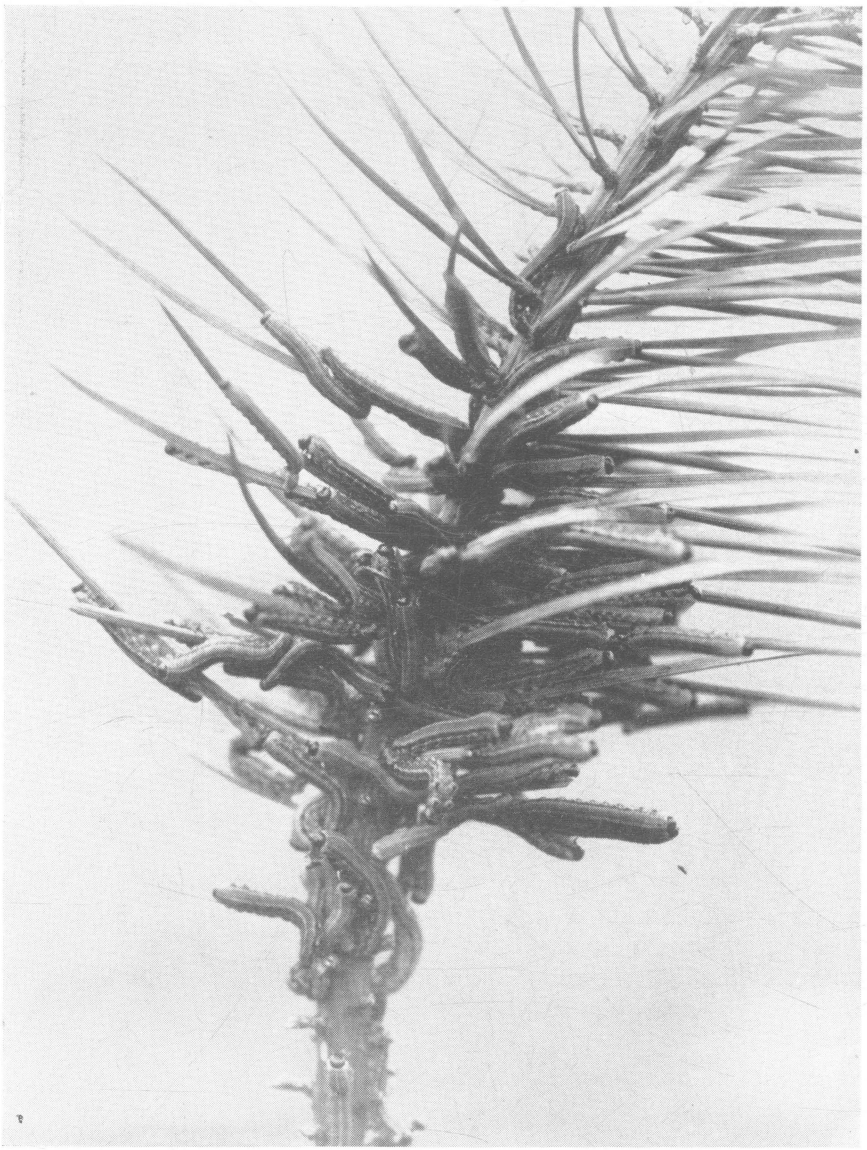

Fig. 2.—European pine sawfly larvae on Scotch pine

Insecticides should be applied when the larvae are small because the newly hatched larvae can be killed more easily than those that are nearly full grown, and because an early application prevents foliage injury.

SPRUCE SPIDER MITE

Oligonychus ununguis (Jac.)

The spruce spider mite or evergreen red spider seldom injures pine trees, but frequently attacks spruce and is a common pest of arborvitae and juniper. Infested foliage becomes dull gray or brown in color. The mites live over winter as orange colored eggs on the needles and twigs. The eggs hatch early in the spring into tiny light green mites. Reproduction continues throughout the summer and a new generation may occur in 17 days.

Mites are too small to be seen readily without a lens, but if a white paper is held under an infested twig and the twig jarred sharply, the mites can be seen crawling over the white paper. Two species of mites that resemble the spruce spider mite are illustrated in Figure 3.

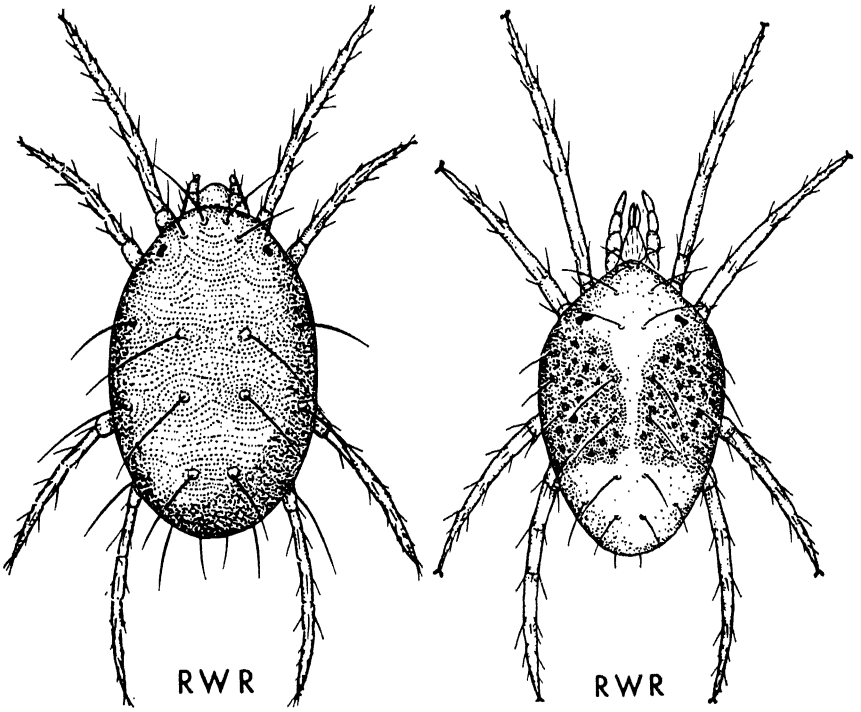

Fig. 3.—Females of two species of "Red Spider", greatly enlarged. (Drawings by Roy W. Rings).

CONTROL

The spruce mite can be controlled with an application of liquid lime-sulfur at the rate of 1 part to 9 parts water before growth starts in the spring, or with one of the following summer sprays or dusts:

Ovotran, 2 pounds per 100 gallons of water or 5 to 10% dust
Malathion, 4 pounds of 25% powder, or 1 quart of 50% emulsifiable concentrate per 100 gallons of water or 5% dust
Aramite, 2 pounds per 100 gallons of water
Dimite, 1 pint per 100 gallons of water
A sulfur dust. (Do not apply when temperature exceeds 90° F.)

One application of Ovotran is usually adequate for a season, and a 10% Ovotran dust applied by airplane at 30 pounds per acre has proven effective. The other materials listed for summer sprays or dusts may need to be applied twice with an interval of 5 to 10 days if the infestation is severe.

THE EASTERN SPRUCE GALL APHID

Chermes abietis L.

Peculiar structures which resemble tiny pineapples sometimes occur on spruce twigs (Figure 4). They occur most commonly on Norway spruce, but are observed occasionally on white, black, and red spruce as well. Such structures are known as galls and are caused by the eastern spruce gall aphid.

The spruce gall aphid lives over winter as an immature female in a crevice at the base of a spruce bud. It begins feeding early in the spring and deposits a mass of eggs early in May. Newly hatched aphids appear very soon after the shucks fall away from the buds. The tiny insects crawl into the developing mass of needles where they feed and in a relatively short time are completely enclosed in a gall. Late in the summer the galls break open and winged adults emerge. These deposit the eggs that produce the individuals that live over winter.

CONTROL

If the galls are not numerous the insects can be held in check by cutting out and destroying the newly formed galls in June when the aphids are inside them.

When the young aphids become established in a mass of new needles they are protected from the action of insecticides. However, the overwintering aphids can be killed and the formation of galls prevented by

spraying infested trees in the spring before new growth appears. Lime-sulfur may be used for this purpose at the rate of 4 gallons of the liquid or 16 pounds of dry lime-sulfur in 100 gallons of water.

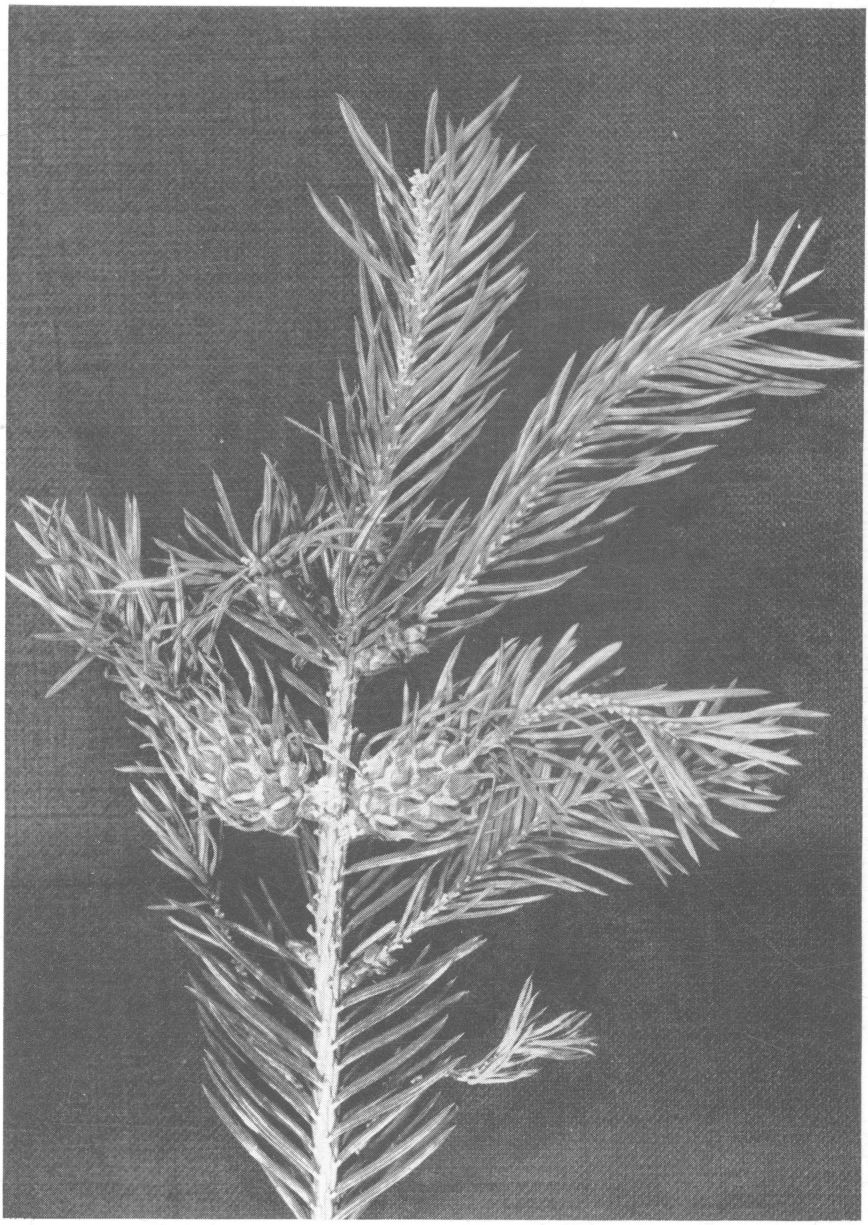

Fig. 4.—Galls caused by the eastern spruce gall aphid

Black Leaf 40 at the rate of 1½ pints with 3 pounds of soap per 100 gallons of water may also be used, but it should be applied on a relatively warm day.

PINE BARK APHID

Pineus strobi (Htg.)

The pine bark aphid is rarely seen because it is hidden beneath a mass of white, cottony secretion. These cottony masses occur in great abundance on the trunk and large branches of white pine, and when numerous may be conspicuous (Figure 5). Small trees may be killed.

Fig. 5.—A pine bark aphid infestation on white pine

The pine bark aphid lives over winter as a mature female within the protection of the cottony secretion. Reproduction begins early in the spring and may continue throughout the summer.

CONTROL

Sprays may be applied for the control of the pine bark aphid at any time during the spring and summer, but are usually most effective early in May. One of the following materials may be used:

Malathion, 4 pounds of 25% powder, or 1 quart of 50% emulsifiable concentrate per 100 gallons of water

Black Leaf 40, 1½ pints with 3 pounds of soap in 100 gallons of water

Lindane, 1 pound of 25% powder, or 1 pint of 20% emulsifiable concentrate per 100 gallons of water

PINE NEEDLE SCALE

Phenacaspis pinifoliae (Fitch)

The pine needle scale is a conspicuous white scale insect that may occur on most species of pine and spruce trees (Figure 6). The insect lives over winter in the egg stage and as many as 30 oblong, reddish eggs may occur under the dead scale covering of the parent female which is only about ⅛ inch long.

The eggs hatch in May in northern Ohio and the newly hatched crawlers feed on the green needles. They reach maturity during July and a second brood then appears.

CONTROL

The most effective control measure for the pine needle scale consists in an application of liquid lime-sulfur at the rate of 1 part to 9 parts water, late in April or early in May.

Although somewhat less effective than lime-sulfur, malathion at the rate of 4 pounds of 25% powder or 1 quart of 50% emulsifiable concentrate per 100 gallons of water, may be applied between May 15 and June 1 to kill the newly hatched crawlers.

WHITE PINE WEEVIL

Pissodes strobi (Peck)

As the name implies the white pine weevil is primarily a pest of white pine. The adult is a snout beetle about ¼ inch long. It is reddish brown in color, irregularly marked with brown and white scales.

The adults live over winter in the duff under the trees and appear on the trees very early in the spring. They feed primarily on the bark of the leader and soon begin laying eggs in holes in the bark. The larvae feed

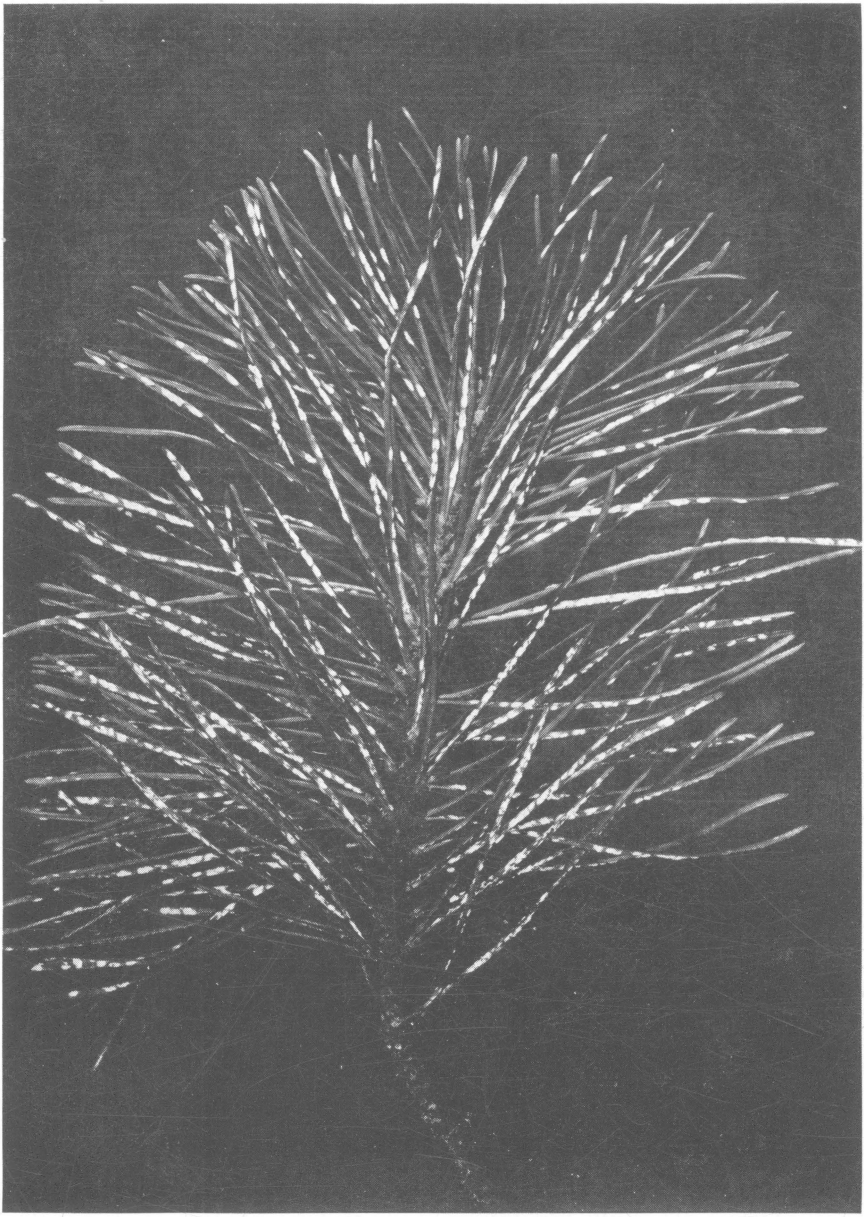

Fig. 6.—Pine needle scale on white pine

in the inner bark and usually girdle and kill the leader (Figure 7). It is not unusual for the top of a tree to die as far down as the third whirl of branches. As the larvae become full grown they change to pupae inside their burrows and the adults emerge during August and early September.

CONTROL

A concentrated lead arsenate spray applied only on the leaders of infested white pine trees is suggested for the control of the white pine weevil. The following formulation is recommended by the Forest Service of the U. S. Department of Agriculture for use in a knapsack sprayer equipped with a nozzle that will deliver 1 to 2 gallons per hour:

1. Pour 2 gallons of water into a mixing barrel.
2. Add 2 ounces of spreader such as Dreft, Tide or other wetting agent. Mix.
3. Add 4 pounds of lead arsenate. Mix.
4. Add 20 fluid ounces of linseed oil. Mix.
5. Add water to make 5 gallons of spray mixture.

PINE TUBE MOTH

Argyrotaenia pinatubana (Kearf.)

The pine tube moth occasionally attacks white pine. The larvae are greenish yellow and about ½ inch long when full grown. By tying together 5 to 20 needles with silk each larvae forms a tube in which it lives (Figure 8). It feeds primarily on the tips of the needles that form the tube. Two broods occur each year. The moths appear and lay eggs in late April or May and in July.

CONTROL

This insect seldom becomes sufficiently abundant in Ohio to warrant control measures. However, most of the newly hatched larvae can be killed by spraying infested trees in May or in August with lead arsenate at the rate of 4 pounds in 100 gallons of water.

SPRUCE NEEDLE MINERS*

The larvae of three species of moths sometimes mine spruce needles and produce nests composed of dead needles and frass held together by silken threads. The adult moths appear in late May or June and deposit eggs on the needles. The larvae bore into and feed inside the old needles. As the injured needles die they are added to the nest. The larvae live over winter in the mined needles or in the nest and resume feeding when warm weather returns.

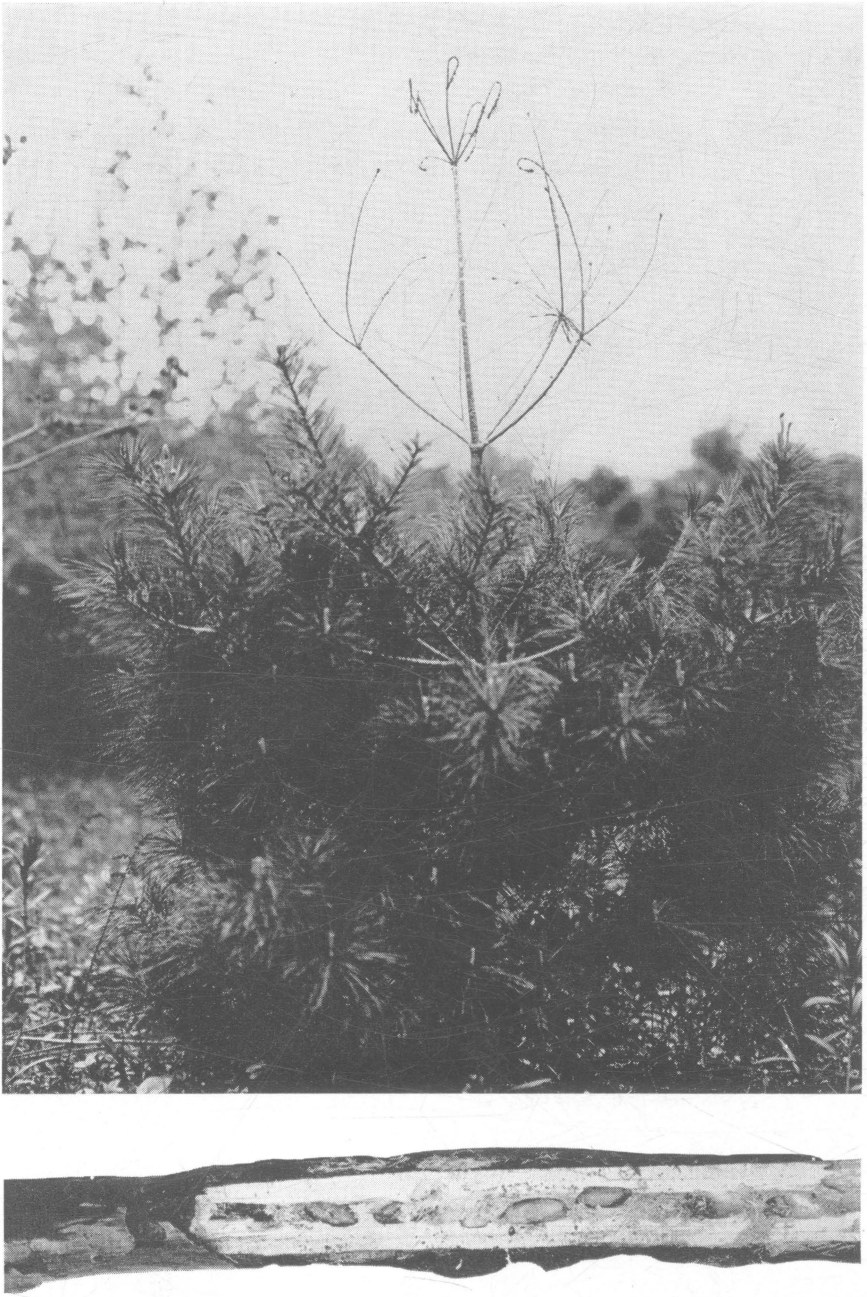

Fig. 7.—White pine weevil injury. Upper: Typical injury on young white pine. Lower: A leader cut open to show the insects within.

CONTROL

A spray containing 2 quarts of 25% DDT and 1 quart of 50% malathion emulsifiable concentrate per 100 gallons of water is suggested for the control of spruce needle miners. It should be applied liberally and with considerable force during the latter part of June.

**Taniva albolineana* (Kearf.)
Epinotia nanana (Treit.)
Recurvaria piceaella Kearf.

Fig. 8.—Pine tube moth injury on white pine

Fig. 9.—A nest of frass and dead needles formed by spruce needle miners.